**Title: Orion Model 290A pH Meter**

**Purpose:**

To provide a standard operating procedure for the use and calibration of the Orion Model 290A portable pH meter.

**Scope:**

This procedure applies to the operation and calibration of the Orion Model 290A pH meter only. Frequency and timing of measurements is determined by the study protocol. Individuals operating this pH measurement should be familiar with the operating instructions before use.

**Health/Safety Warning:**

When working with potentially hazardous materials, follow EPA, OSHA, and other specific health and safety procedures. Be prepared in case of emergency (e.g., telephone numbers, first aid kit). Personnel should wear an apron or lab coat, gloves and safety glasses when handling hazardous chemicals. Consult MSDS before handing chemicals.

**Equipment and Supplies:**

Orion Portable pH Meter model 290A
pH buffer standards (ex., Fisher Scientific pH 4.00 (P/N SB101), pH 7.00 (P/N SB107), pH 10.00 (P/N SB115))
Deionized (DI) water

**Reagents:**

None.

**Procedure:**

1. Check and replace battery regularly prior to field use. Perform the self-test and meter setup after replacing the battery. The instrument uses a 9 volt lithium (100 hr life) or alkaline (50 hr life) battery.

2. Visually inspect the deionization system resistance meter indicator light (located in electrical equipment room #111). If the light is off, change the filter cartridges before further use (See SOP #GEN 101.0).

3. The pH meter should be calibrated daily before it is used with at least two buffer standards that bracket the expected sample range. Fresh standards should be used to ensure accurate results.

4. Press the **power** key to turn meter on. If battery indicator remains on, replace the battery.

5. Press the **mode** key until the arrow at the bottom of the display points to pH.

6. Rinse the electrode with DI water and place in the first buffer.

7. Press **2nd cal**; CALIBRATE and the time and date of the last calibration will be displayed. After a few seconds P1 will be displayed.

8. Wait for a stable pH reading. Press the up or down arrow key, the first digit will flash, use these keys to scroll to the correct digit and press **yes** to accept; continue for each digit until the correct value is displayed and press **yes**.

9. The P2 prompt will be displayed.

10. Rinse the electrode with DI water and place into the second buffer.

11. Wait for a stable reading and enter the correct value as above.

12. Press **measure** to finish calibrating.

13. The average electrode slope is displayed at the 'SLOPE' prompt. Record the slope in the appropriate log (ex., Calibration log, Water Chemistry log or Water Quality log) as determined by the study protocol.

14. The meter is now ready for sample measurement. Rinse the electrode and place into sample.

15. Record the pH value in the appropriate log as determined by the study protocol when 'READY' is indicated on the LCD. Rinse the probe between samples.

16. Refer to operation and maintenance manual in the Instrument Manuals binder (Tox Lab bookshelf) for further information.

**Calculations/Data Handling/Documentation**

Calibration information and pH model number must be recorded in the appropriate log(s) (ex., pH Meter Calibration log, Water Chemistry log or Water Quality log) as determined by the study protocol.

**References:**

Orion Model 290A Portable pH/ISE Meter Instruction Manual.

USDA/ARS - SNARC - SOP# GEN 101.0: Milli-Q Water.

USDA/ARS - Stuttgart/Pine Bluff Location – Safety Health and Security Plan.

Barker, K. 1998. At the Bench: a Laboratory Navigator. Cold Spring Harbor Laboratory Press. 460 pp.

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